

Claims

1. A process for preparing cyclododecene comprising:

contacting at least one starting material selected from the group consisting of

5 cyclododecatriene, cyclododecadiene and mixtures thereof, in the gas phase with a catalyst in a fixed-bed reactor in the presence of hydrogen,

wherein the Bodenstein number for the process in the fixed-bed reactor is greater than

100.

10 2. The process as claimed in claim 1, wherein the Bodenstein number is greater than
500.

3. The process as claimed in claim 1, wherein the Reynolds number is greater than 10.

15 4. The process as claimed in claim 1, wherein the throughput per amount of catalyst is
from 15 to 500 g, of at least one starting material selected from the group consisting of
cyclododecatriene, cyclododecadiene and mixtures thereof per gram of Pd•h.

20 5. The process as claimed in claim 1, wherein the catalyst is in the form of a shaped
body.

6. The process as claimed in claim 1, wherein catalyst is in the form of a shaped body
and the shaped body comprises more than 90% by weight of support material, based on the
total weight of the shaped body.

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7. The process as claimed in claim 1, wherein the catalyst is in the form of a shaped
body and the shaped body is essentially round.

8. The process as claimed in claim 1, wherein the catalyst is in the form of a shaped body and has a diameter of more than 0.5 mm.

9. The process as claimed in claim 1, wherein the catalyst is present on a support material and is in the form of shaped body comprising γ -aluminum oxide.

10. The process as claimed in claim 1, wherein the catalyst is present on a non-metal support material.

10 11. The process as claimed in claim 1, wherein the catalyst is in the form of a shaped body and comprises at least one finely divided, catalytically active metal of group VIII of the periodic table of the elements.

15 12. The process as claimed in claim 11, wherein the distribution of the catalytically active metal in the shaped body is not homogeneous.

13. The process as claimed in claim 11, wherein the shaped body has an outer layer having a thickness of not more than 1/10 of the maximum dimension of the shaped body; and more than 70% by weight of the catalytically active metal is present in this layer.

20 14. The process as claimed in claim 1, wherein the catalyst comprises catalytically active palladium.

25 15. The process as claimed in claim 1, wherein the molar amount of hydrogen is from 0.9 to 1.2 times the amount required to hydrogenate the theoretical amount of cyclododecatriene and cyclododecadiene to cyclododecene.

16. The process as claimed in claim 1, wherein the contacting is carried out at a temperature in the range of from 90 to 180°C.

17. The process as claimed in claim 1, wherein the contacting is carried out under an inert gas.

5 18. The process as claimed in claim 1, wherein the contacting is carried out in the presence of hydrogen and carbon monoxide.

19. The process as claimed in claim 1, wherein the contacting is carried out in the presence of hydrogen, carbon monoxide and at least one inert gas.

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20. The process as claimed in claim 1, further comprising:
vaporizing the starting material in an inert gas atmosphere.

15 21. The process as claimed in claim 1, wherein the total pressure in the gas phase is from 50 to 10,000 hPa.

22. The process as claimed in claim 1, carried out continuously.

20 23. The process as claimed in claim 1, wherein the Bodenstein number is greater than 1,000.

25 24. The process as claimed in claim 1, wherein the Reynolds number is greater than 100.

25 25. The process as claimed in claim 1, wherein the Reynolds number is greater than 200.

26. The process as claimed in claim 1, wherein the throughput per amount of catalyst is from 20 to 100 gm of at least one of cyclododecatriene or cyclododecadiene/g Pd•h.

27. The process as claimed in claim 1, wherein the catalyst is in the form of a spherical shaped body.

5 28. The process as claimed in claim 1, wherein the catalyst is in the form of a shaped body having a diameter of more than 2 mm.

29. The process as claimed in claim 1, wherein the contacting is carried out at a temperature of from 100 to 160°C.

10 30. The process as claimed in claim 1, wherein the contacting is carried out in the presence of hydrogen and an inert gas comprising nitrogen.

15 31. The process as claimed in claim 30, wherein the contacting is carried out in the presence of hydrogen and an inert gas comprising nitrogen and carbon monoxide.

32. The process as claimed in claim 1, carried out under plug flow conditions.